

**ADDITIVES FOR HYDROCARBON FUELS**

The present utility patent application is based on and claims priority from United States Provisional Patent Application Serial Number 60/288,812 filed on May 4, 2001.

5       The present invention relates generally to certain new and useful improvements in additives for hydrocarbon fuels such as LPG, gasoline and diesel fuel.

More particularly, the present invention relates to improved additives for hydrocarbon fuels, wherein the additives include a predetermined amount of a predetermined hydrocarbon mixture, a predetermined amount of predetermined hydrotreated distillates, and a blend of vapor phase inhibitors.

**Background of the Invention**

Liquified petroleum gases (LPG), which are primarily comprised of propane and butane, are widely used as engine fuels. These products are obtained from natural gas and crude oil processing operations and are generally classified as LPG, propane, butane, and butane-propane mixtures in accordance with specifications published by the Gas Processors Association.

15       The relevant art concerning additives for LPG fuels is exemplified by U.S. Patent 5,782,936 and applicant's prior U.S. Patent 5,823,758.

It is a desideratum of the present invention to avoid the animadversions of previous additives.

20       More particularly, the present invention achieves the objects and purposes of

applicant's prior U.S. Patent 5,823,758 but without the use of metal oxide catalysts, and yet accomplishes same while avoiding and/or minimizing precipitating out of any components.

### **Summary of the Invention**

5           The present invention provides new and improved additives for hydrocarbon fuels, comprising active components including a hydrocarbon mixture in the range of approximately 60% to 76% by volume, hydrotreated distillates in the range of approximately 10% to 16% by volume, at least one predetermined vapor phase inhibitor, and at least one predetermined surfactant.

10           One of the primary objects of the present invention is to provide improved additives as described hereinabove which permit substantially complete oxidation of the hydrocarbon fuels to be achieved even when the hydrocarbon fuels contains significant quantities of impurities such as sulfur, water, propylene, long chain hydrocarbons, etc.

15           It is another object of the present invention to provide improved additives as described hereinabove which substantially reduce or eliminate polluting emissions normally caused by incomplete oxidation, while simultaneously reducing emissions of nitrogen oxides.

20           Another object of the present invention is to provide improved additives as described hereinabove which minimizes and/or avoids any settling out or precipitating out of any substances and/or components.

          It is a further object of the present invention to provide improved additives as described hereinabove which accomplishes the aforementioned objects without the use of metal oxide catalysts.

Another object of the present invention is to provide improved additives as described hereinabove which increase heating value after vaporization.

Another object of the present invention is to provide improved additives as described hereinabove which increase burning velocity in oxygen.

5 Another object of the present invention is to provide improved additives as described hereinabove which provide an exothermic formation reaction to accommodate efficiencies of primary and secondary combustion.

The present invention possesses many advantages and features which will become more apparent to those persons skilled in this area of technology and others when reading the detailed description of the preferred embodiments of the present invention as set forth hereinbelow.

#### **Detailed Description of the Preferred Embodiments of the Invention**

10 In accordance with a preferred embodiment of the present invention, there is provided an additive for hydrocarbon fuels, comprising active components including a hydrocarbon mixture in the range of approximately 60% to 76% by volume, and hydrotreated distillates in the range of approximately 10% to 16% by volume, at least one predetermined vapor phase inhibitor, and at least one predetermined surfactant.

15 Preferably, but not necessarily, the additive may include the following active components: hydrocarbon mixture; hydrotreated distillates; petroleum amines; aromatic hydrocarbon; and vapor phase inhibitors.

20 In accordance with some preferred embodiments of the present invention, the improved additive would include the following active components:

hydrocarbon mixture

60% to 76% by volume;

|                                 |                             |
|---------------------------------|-----------------------------|
| hydrotreated distillates        | 10% to 16% by volume;       |
| petroleum amines                | 5% to 8% by volume;         |
| aromatic hydrocarbon            | 5% to 8% by volume;         |
| vapor phase inhibitors          | 1% to 3% by volume;         |
| anionic and ionic surfactants   | 0.5% to 1.0% by volume; and |
| N-docdecyl-8-D-lauryl maltoside | 0.2% to 1.0% by volume.     |

The aforementioned hydrocarbon mixture may preferably comprise any suitable hydrocarbon mixture, such as, for example, petroleum distillates.

The aforementioned hydrotreated distillates may preferably comprise any suitable hydrotreated distillates, such as, for example, magnesium lauryl sulfate.

The aforementioned petroleum amines may preferably comprise any suitable petroleum amines such as, for example, amine phosphates, or sodium lauryl sulfate.

The aforementioned aromatic hydrocarbon may preferably comprise any suitable aromatic hydrocarbon, such as, for example, a high K-B (Kari-Butyl) solvent, like Terpinol.

The aforementioned vapor phase inhibitors may preferably comprise any suitable vapor phase inhibitors, such as, for example, fatty acids or organic acids.

The anionic and ionic surfactants are incorporated to absorb and/or pass through moisture and fuel impurities.

The N-docdecyl-8-D-lauryl maltoside is incorporated to displace membrane lipids from the gas/impurities.

The additives in accordance with the present invention provide hydrophobic tail structures for rapid vaporization.

Although the additives in accordance with present invention may be effectively used

with any hydrocarbon fuel, the present invention is particularly suitable as an additive for LPG.

There have described hereinabove only certain preferred embodiments of the present invention which can be formulated in many different ways.. It should be understood that many changes, modifications, variations, and other uses and applications will become apparent to those persons skilled in this particular area of technology and to others after having been exposed to the present patent applications.

Any and all such changes, modifications, variations, and other uses and applications which do not depart from the spirit and scope of the present invention are therefore covered by and embraced within the scope of the patent claims set forth hereinbelow.